Middle East Journal of Applied Science & Technology (MEJAST)
Volume 7, Issue 2, Pages 42-54, April-June 2024

Assessing the feasibility of backward design approach in Mauritian Public Universities

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DOI: https://doi.org/10.46431/MEJAST.2024.7206

Article Received: 05 March 2024 *Article Accepted: 07 May 2024* *Article Published: 11 May 2024*

ABSTRACT

The backward design approach is a new course development technique being implemented in Mauritius among public Mauritian universities. The main objective is to ensure effective blended learning to Mauritian students based on Moodle learning platform. Backward learning enabled the setting of course aims aligned with students' needs and then working back to developing learning outcomes created from Open Educational Resources (OERs). The training was provided to forty staff from the four public Mauritian universities. For the research evaluation, the qualitative method was used through feedback responses from all 40 participants in the training. The key results found were that the backward design concept was well grasped by the participants during the training including its benefits for teaching. Immersive learning was a fundamental attribute of such a technique. The training considerations like empowerment and engagement were prioritised. Participants also addressed challenges namely design, application and time linked with this teaching and learning approach. In a nutshell, backward design could be envisaged in Mauritius with regards to new programmes of study having more practical than academic weighting. It might be applied to project-based assessments and innovative courses which might lack proper learning materials but might depend on OERs.

Keywords: Backward design; Open educational resources; Reverse design concept; Benefits; Challenges; Applicability; Importance; Feasibility; Contextualisation; Higher education.

1.0. Introduction

Backward design is a process that educators use to design learning experiences and instructional techniques to achieve specific learning goals. Such design begins with the objectives of a unit or course namely what students are expected to learn and be able to do. It then proceeds "backwards" to create lessons that achieve the desired objectives. The seminal work of Wiggins and Mc Tighe (2005) opens up the debate of creating courses by design and this model is now being sought in blended learning in the current Mauritian higher education context.

The instructional objectives for a course or unit will be the learning standards for a given course, in that, there are concisely written descriptions of what students are expected to know and will be able to do at a specific stage of their education. The basic logic motivating backward design is that starting with the end goal, rather than starting with the first lesson given chronologically during a unit or lesson. This approach helps teachers design a sequence of lessons, developing problems, projects, presentations, assignments and assessments. in students achieving the academic objectives of a course or unit, i.e., actually learning what they were supposed to learn (Wiggins and Mc Tighe, 2011). Backward design helps teachers create lessons and units that are goal-oriented— learning—rather than process-oriented—teaching. Since "starting from the end" is often a counter-intuitive process, backward design gives educators a structure they can follow when creating a programme and planning their instructional process. Proponents of the backward design might argue that the pedagogical process should serve the purposes; goals and outcomes for students rather than being determined by process. According to Bowen (2017), backward design is considered a much more intentional approach to course design than traditional methods of design.

Davila (2017) with reference to Wiggins and Mc Tighe's (2005) philosophy supports that teachers who are in charge of developing the curriculum, focus their planning on assuring that they cover all of the topics suggested

either by governmental policies such as standards, or concentrate more on the type of activity to be carried out by students paying little attention to the real purpose, usefulness, and impact on students understanding of the topic.

1.1. Objectives of the Study

A few objectives have been identified in connection with the research undertaken on the relevance of backward design approach that might be implemented in the Mauritian curriculum. They are as follows:

(1) To analyse the importance of backward design important in Mauritian education.

(2) To assess the benefits of backward design in the Mauritian context.

(3) To identify the training implications are needed in backward design prior to its implementation.

(4) To identify the challenges in backward design as a course development approach.

2.0. Problem Statement

In the present context, most higher education institutions in Mauritius use the 'forward design' technique where educators firstly consider the learning activities followed by the development of assessments around such learning outcomes. Such a technique is linked with the learning goals.

The argument is whether there might be an alternate approach to course design that has been tried in Mauritius or not. The current situation favours the achievement of learning objectives as prescribed in a course. This might well apply to academically-focused courses but what about setting courses that precise meet students' needs depending upon their level of competence and matching them with their immediate job needs?

This present context confirms the use and potential application of 'backward design' in Mauritius. A pragmatic learning approach might better help educators establish learning goals first. Such goals should cover knowledge and skills that students need to have when they complete their course. This framework forwards that educators should know the course goals first and establish which assessments they could develop. The teaching intention is prioritised to meet the student's needs and not the course needs. How beneficial a programme might be for learners can sometimes be more important than purely learning according to a desired framework where all material is not necessarily needed.

2.1. Research Questions

Four key questions were identified for this research.

- Why is backward design important in Mauritian education?

- How might the backward design be beneficial to a Mauritian context?

- What training implications are needed in backward design prior to its implementation?

- What challenges might exist in backward design as a course development approach?

3.0. Literature Review

Perceptions on the benefits of backward design are available from selected literature. According to Wiggins and McTighe (2011), transfer of learning in backward design refers to students' ability to apply acquired knowledge and

skills to a new situation or other contexts. Students are said to have fully understood the concept if they can apply it to other contexts.

Davidovitch (2013) states that planning a lesson using backward design indisputably requires careful thought, time and effort. In backward design, there is no room for spontaneity, hence teachers must learn and be patient to effectively plan each lesson.

Linder et al (2014) consider backward design as a lesson creation method that encourages teachers to identify their goals for student understanding and implement measurable goals for learning from the outset. They focused on a group writing programme that encouraged group goal-setting and learning the skills needed to achieve those goals.

When it comes to the benefits of backward design, lesson planning using backward design is found to be important for improving students' academic performance in tests and exams. According to Kelting-Gibson (2003), instruction delivered through backward design helps students achieve higher levels of academic performance. Jozvik et al. (2017) state that backward design focuses on teaching and assessing students to encourage understanding of main ideas and transfer of knowledge through authentic performance.

Criticisms of backward design do exist however. Despite the benefits of reverse design in planning and delivering instruction, the concept is still not a popular approach to lesson planning. Ornstein and Hunkins (2018) state that backward design is a more popular approach in curriculum development. Teachers spend more time developing assessment strategies before the development of instructional activities (Song, 2008).

According to Jozvik et al. (2017), teachers do not have proficient knowledge and skills to plan lessons using backward design. They require more training on how to align, collaborate, and improve the components of the reverse design framework (Hero, 2018).

Recent criticisms of the use of learning objectives in backward design can also range from questions about who is qualified to determine objectives to the challenges of taking into account longer-term educational objectives that cannot be assessed within a single course. According to Mc Creary (2022), there is firstly the concern that listing objectives artificially delineates what can be gained from a course. By channelling attention towards a few predefined targets, room for improvisation and spontaneity in the classroom is restricted. Additionally, there is the fear that stating goals in advance may undermine the value of the students' own goals for taking the course (McCreary, 2022).

There is empirical examination to support the benefits of backward design reveals that such design allows teachers to be creative and use skills and methodologies according to students’ needs and also to be very reflective in the way of designing courses. In their study, Ontaneda and Sanchez (2019) applied the paired t-test to compare the scores of students at the same level. In their research, the experimental group (G2), to which backward design was applied, performed better than the control group (G1), which did not apply it. The results revealed that the backward design was very meaningful not only for the students, but also for the teachers.

According to Ontaneda and Sanchez (2019), it was true that the establishment of appropriate action plans, the selection of the best resources and the implementation of a final evaluation through a summative task, offered the opportunity for students to gain confidence in the language and apply it in a real context.

From other illustrations, Hosseini et al. (2019) found that backward design had a positive effect on student academic achievement.

4.0. Proposing an approach to backward design in a Mauritian university context

All universities have basically adopted the 'forward design' which considers setting the course aims and objectives, devising the programme in the context of what should be learned and acquired by students and this entails the development of a course that is systematic. The course planning and design depend on learning outcomes. In general, the programme remains progressive but ascertains that all the learning requirements are achieved. It is a sequential approach since it is based on gaining basic competencies first followed by further or advanced learning competencies. The traditional mode of course design has not changed over the years but has been partly reviewed to accommodate blended learning. Today programmes use both face-to-face and online teaching. Since online teaching is new, course preparation and provision have to be readapted to the needs of students learning in this mode. Certainly, the same teaching practice as done in traditional learning does not apply.

4.1. Contextualising backward design to Mauritian tertiary institutions

To partly address the issue of providing effective learning, the backward design might be proposed in universities. In this context, public universities in Mauritius recently approved the design of courses using the backward design technique. This was an initiative between the Commonwealth of Learning (COL), the Higher Education Commission (HEC) and the four public universities in Mauritius namely the University of Mauritius (UOM), the University of Technology Mauritius (UTM), the Open University of Mauritius (OUM) and the Université des Mascareignes (UdM).

A cohort of some 40 academic staff followed the training programme in backward design based on Open Education Resources (OER). A five-day training course on Moodle with specialised training on using tools like Forum, Chat, creation of educational videos using H5P, rubric-based assessment using Merlot, etc. were being taught to the staff.

The next three weeks comprised learning how to develop the programmes including communicating effectively with students using the hybrid mode. It was hereby stressed that the backward design technique would remain the backbone of the course developed within this collaboration.

From May to July 2023, all four universities created their courses. It could be generally assessed that some 40 courses were created or are being finalised to address the first cohort of learners. The Moodle-based courses would be provided both to university students including independent learners. On completing the course, a student would earn credits under the Credit Learning Transfer System (CLTS) and might be waived for some electives or modules in case he/she would enroll in a university programme.

4.2. Developing courses using backward design

The key imperative in developing the Open Education Resources was to firstly think about the concept of backward design. This was a novel approach not too much known or even applied to teaching in Mauritius. Still today, to ensure quality education, all universities need to develop student module information sheets (MIS) to inform them of the sequence of learning during the programme.

The new perspective created some enthusiasm among the trainees whereby they all needed to start from behind. To put it clearly, they needed to firstly assess what students might need for a certain course, consider what might be the formative assessments that would be needed before searching the learning requirements. In this way, the learning outcomes would be based on students' needs and not on the university programme needs (Wiggins and McTighe, 2011). This was practical as lecturers or trainees would first have in mind what they should teach and where they could locate such learning requirements.

4.3. Backward Design and Open Education Resources

These were based on Open Education Resources (OERs) available online and provided by universities, academics and training organisations. Using the CC-BY4.0 notation (Creative Commons.org, 2023), learning resources could be directly taken from the sources, remixed, reused and adapted to the needs of learners in Mauritius. There is currently no authoritative definition for the term OER, with the OECD preferring "digitised materials offered freely and openly to educators, students and self-learners for their use" and reuse them for teaching, learning and research" (OECD, 2007).

This concept was quite challenging at the beginning because academics have been better used to developing their courses generally from standard textbooks available from top publishers like Prentice Hall, Longman or Pearson, just to name a few. The question of creating courses from OER was daunting and looked more like creating basic courses by copying information from blogs or related websites.

The reality was that the effort was worthwhile in that OERs existed for a variety of subjects and need not only be copied. By giving credit to the creators of such resources, academics would contextualise them and adapt them to the Mauritian reality. The other interesting issue was that such courses could not be copied entirely as OERs come from a variety of sources that could enrich the programmes. The onus of academics was to find out ways to source out a range of OERs that could connect them to their existing programme. The issue of sourcing licenses under CC-BY-4.0 and similar ones encouraged trainees to ensure that all courses using backward design would be essentially based on such Creative Commons attribute (Creative Commons, 2023).

5.0. Methodology

The methodology comprised addressing four research questions with regards to the relevance of the backward design technique in tertiary education. 40 participants took part in the training programme developed jointly by the COL and the HEC in May 2023. Data collection was based on the questions raised on the learning platform during the three-week training activity followed by a mandatory requirement trainees to post questions. The questions were deemed worth the founding research questions of this research. No sampling was undertaken as the number of sample size was low. All members were included.

Data collection was based on forums were included in each learning unit that enabled training to mandatorily post their replies and grade them by their peers. These were moderated by the course facilitator, an expert from COL, India.

Since the collection of data was based on forums, a qualitative approach was used. The topics that related closely to the research questions were chosen through an analysis of the main or prominent responses provided by the

participants. To avoid duplication or information redundancy, answers were transcribed in outline form while respecting as closely as possible the message integrity. No distortion was officially entertained as a means of respecting the ethical guidelines of research.

6.0. Findings

The findings were related to the four research questions that focused on the importance of backward design in Mauritius, its benefits, the training requirements of such a technique as well as the challenges of backward design in the Mauritian context particularly in higher education. Each set of responses is analysed below.

6.1. Importance of backward design important in Mauritian education

Respondents commented that backward design, was an instructional approach used by educators to plan and develop courses and lessons with a clear focus on desired learning outcomes.

Respondents stated that in backward design, the process started by identifying desired learning outcomes or objectives, and then instructional activities and assessments were developed to achieve these outcomes.

With regards to their understanding of the backward technique, respondents commented that the three key steps to reverse design were:

Identification of the learning outcomes where educators begin by determining the specific knowledge, skills, and understanding they want students to acquire at the end of instruction.

Planning assessments where educators design assessments that measure how well students have achieved the desired outcomes. Assessments can include tests, projects, presentations, or other forms of assessment.

Development of instructional activities where educators design instructional activities that align with the learning outcomes and help students develop the skills and knowledge required to succeed on the assessments.

Respondents commented that backward design emphasised a student-centered approach to teaching, where instruction is intentionally designed to help students master specific learning objectives.

The respondents' views aligned with that of Linder et al (2014) considering backward design as a lesson creation task where teachers to identify their goals for student understanding and implement measurable goals for learning from the outset.

6.2. Benefits of backward design to the Mauritian context

Participants formulated their views on the benefits of backward design. Some key statements are transcribed below.

'The process of backward design can certainly help ensure that course and programme outcomes, as well as the outcomes of individual assessments are in alignment. There is evidence of immersive learning from my experience'

'I like the concept of engaging the student in the learning process and there is a higher level of immersion in the learning.'

'Backward design is nice that the overview of the course is essentially filled in at the beginning. That allows the faculty to go back and add the content that they feel is most appropriate.'

It might be summed up that through backward design, educators might ensure that the learning objectives are met in an effective and efficient manner.

A positive contribution might emanate from Hosseini et al. (2019) who supported that backward design had a positive effect on student academic achievement. In the same line, Campbell (2022) points out that teachers must be coaches of understanding not mere purveyors of content, knowledge, skill or activity.

Wiggins and McTighe (2011) argue that backward design is focused primarily on student learning and understanding. When teachers are designing lessons, units, or courses, they often focus on the activities and instruction rather than the outputs of the instruction. Therefore, it can be stated that teachers often focus more on teaching rather than learning. This underlies the relevance of immersive learning.

6.3. Training implications needed in backward design prior to its implementation

With regards to the training implications of backward design, respondents gave some valuable insights listed below.

‘Backward design can be a powerful and beneficial method for curriculum planning, if used appropriately and wisely. To implement it, educators need to start by creating a clear and compelling vision for their programme, based on their mission, values, and goals as an educator.’

‘It is important for trainers to collaborate with teachers, experts, and stakeholders to design and review outcomes, assessments, and activities.’

‘Trainers must inform educators that they need to be flexible to the changing needs and circumstances of their students and programmes, ready to review learning plans as needed.’

‘Trainers must encourage educators as trainees to support students throughout the learning process by providing clear guidance, instructions, examples, and feedback.’

With reference to training needs for educators, Layne (2023) states that every educator must consider the strengths and weaknesses of his diverse learners and employ differentiated instruction techniques to meet their individual needs. This approach recognises and supports the unique learning styles, abilities, and backgrounds of students. It involves tailoring instruction to accommodate various learner characteristics, such as their readiness, interests, and learning preferences. By implementing differentiated instruction techniques, teachers can effectively address the diverse needs of their students, promoting engagement, motivation, and academic success (Layne, 2011).

6.4. Challenges in backward design as a course development approach

Respondents argued that backward design could be a difficult and time-consuming process to implement, particularly for trainee teachers who lack the necessary skills or resources.

'Some responses stated that backward design might also limit the opportunities for spontaneous learning, be overwhelming and frustrating for students used to traditional instruction, and be unrealistic or impractical due to the constraints of the educational context. Educators should be aware of these potential disadvantages and address them accordingly.

With regards to its acceptance, respondents commented that educators and institutions with established curricula and teaching methods might face resistance when transitioning to backward design as it might contest existing practices and require a paradigm shift in curriculum development.

Another challenge that respondents commented was that effective implementation of backward design required access to various resources, including technology, materials, and professional development, which might not be readily available in all educational environments.

In this conjecture, Farr and Turnbull (1997) suggest that one cannot expect significant learning outcomes in the classroom without taking into account the increasing complexity of classroom learning environments and student characteristics and experiences. Cho and Trent (2005) add that discussion of teachers' value-laden pedagogical activities is absent from this 'retrograde' curricular discourse, including on what knowledge matters most and whose knowledge.

In addition, Jozvik et al. (2017) recall that teachers might not have proficient knowledge and skills to plan lessons using backward design while Hero (2018) has supported the view stating that teachers might require additional training on how to align, collaborate, and improve the components of the reverse design framework.

7.0. Discussion

Backward design remains new to the Mauritian context where, in most situations, a top-down classical approach has been always favoured. There might be a possibility that the technique might be applied to short or tailor-made courses provided to potential learners. This is true in that trainers can first decide what learners would like and adapt a course to meet their needs. Leboff (2022) comments that backward design sets goals for what the student should be able to do. The teacher then considers how the student might demonstrate this new ability. Backward design prioritises expected learning outcomes rather than topics to be covered (Wiggins and McTighe, 2005).

In relation to the feedback earned from trainees, there is evidence that the backward design technique might prompt more immersive experience on the part of students who will learn under the blended learning approach. There is also a favourable impression onto using the technique whereby the students' needs are prioritised prior to developing a course and from where courses will be developed. Wagner and Liu (2021) propose a pedagogy through which a teacher can infuse immersive technologies in the course of teaching to stimulate students' learning experiences, thereby improving their enjoyment and learning outcomes.

Presently, backward design technique is basically new and it is, for this particular reason that COL and HEC have come forward to promote such courses in Mauritius. In some way, backward design technique allows universities and higher educational institutions in the Commonwealth and in the developing world to have their own courses created while they were relying extensively on material produced from the Western world. There is the eventuality of effective course development from the developing world. Combined with OER, backward design aligns with the Research on Open Educational Resources for Development (ROER4D) project seeks to build on and contribute to the body of research on how OER can help to improve access, enhance quality and reduce the cost of education in the Global South (Hodgkinson– Williams et al, 2017).

Additionally, there is the main issue of democratising education by creating courses meant for a wider range of students including those who might not attend a university. Such courses are offered at a minimal cost and might also be free for these targeted students.

From the backward design technique, it is seen that this will be more appropriate for beginner-level courses at present because trainees have just followed such a programme and are actually furthering their competence on using Moodle platform. Since Moodle itself requires enough time to master the tools and techniques, it might be true to say that courses that are theoretical and targeted to year 2 or 3 might not be appropriate within the technique albeit they might so be developed through Moodle. According to University College London (2020), students rely on Moodle for up-to-date course information and easy-to-find, accessible learning resources.

An important concern in the Mauritian context remains the successful implementation of courses using the backward design technique. The key question to be asked is whether there will be an instant success of such courses or is there a learning curve to ensure its acceptance and implementation in the learning curriculum at the tertiary level? Davidovitch (2013) posits that planning a lesson using backward design indisputably requires careful thought, time and effort.

There is also the need for support and follow-up. COL partners with higher education institutions to develop and offer courses and programmes through open distance learning. Such interventions and support include relevant policy development for dual-mode operations, developing quality assurance policies and guidelines, capacity building for dual-mode and online/blended operations, including instructional design and the use of OER and learner support (Commonwealth of Learning, 2023). At present, COL facilitates with some staff are supporting the development of the programmes but what about its follow-up? Although the currently trained academics are supposed to become champions of the backward learning technique as they are expected to offer training to upcoming groups of trainees, nothing can be said on the viability of such a project?

8.0. Conclusion

This paper discussed the issue of implementing the backward design technique in Mauritius as part of the new blended learning strategy between the COL, the HEC and the public universities of Mauritius. The main objective is that local universities will be able to develop programmes aligned with blended learning by harnessing the benefits of OERs which stand as very useful and freely available learning resources that students and academics might use. The challenge comes from adopting the backward design technique which is actually limited to some forty academics trained under this programme. Can this technique be effectively applied and approved in Mauritius?

From the initial feedback gained through forums and discussions posted by the trainees, it is seen that there is a favourable response with regards to the course development concept which opposes traditional course design. This can prove to be an opportunity where lecturers will themselves need to know what students want to learn and where they can locate learning material and devise learning outcomes with summative and formative assessments. The fact of relying on OERs is a challenge as lecturers might eschew material from the net and prefer a mix of teaching material based on textbooks and published research. It is necessary, in this context, to see how the current trial stage

of backward design technique would be applicable to Mauritius and what lessons might be learned from it after its initial implementation.

9.0. Limitations of the research

This paper is limited to a Mauritian context where the backward design technique is in its infancy. There is further limitation due to the fact that such a technique has been demonstrated and put into practice with a cohort of just forty trainees. There might be the need to see its impact on a much larger audience in a full-fledged way. This is not the case yet in Mauritius. Nevertheless, the insights from the research do provide some useful feedback on the viability of such a technique.

10.0. Recommendations

The results obtained from the survey might not, on their own, offer recommendations for a nationwide application of backward technique in Mauritius. Since there is a need to apply this concept in higher education, a few recommendations can be formulated.

Firstly, backward design can be implemented in short courses that are developed by local higher education institutions in Mauritius with regards to their practical nature in terms of teaching content. There could be both the use of OERs as teaching resources as well as the technique of setting assignments that are needed by learners since the start of their training. Backward design could be envisaged in Mauritius with regards to new programmes of study having more practical than academic weighting. It might be applied to project-based assessments and innovative courses which might lack proper learning materials but might depend on OERs.

The next recommendation might arise from new courses that depend a lot of Information Technology resources. Established curricula cannot be easily developed because such courses require the latest resources and data. Since OERS might be most relevant sources for documentation and teaching, new courses that might address issues like Artificial Intelligence, Industry 4.0, etc. might adopt the backward design technique.

Another recommendation might be the need to train a large number of educators. The first batch of trainees are expected to become trainers and ambassadors of the backward design technique under the COL and HEC initiatives. There is an utmost need to build capacity in this specific area to ensure that there will be enough capacity available to develop and further such an educational approach to teaching.

There might additionally be the need to seek finance and pedagogical resources to advance the concept of backward learning in Mauritius. Through effective networking and support, it might be possible to really implement and apply the concept. It should be noted that this applies to higher learning as primary and secondary education are so well structured and organised that they will not shift to this technique. Assistance is needed at the level of higher education.

A final recommendation is the implantation or trial run of the first courses actually developed by the 40 participants in the study. It is only through a first run that the strengths and weaknesses of such an approach could be tested and validated. The pros and cons of the approach would need to be clearly debated before deciding upon the options to choose in the future.

Declarations

Source of Funding

The study has no funding from any institution.

Competing Interests Statement

The author declares having no competing interest with any party concerned during this publication.

Consent for Publication

The author declares that he consented to the publication of this study.

Authors' contributions

All research work is from the author.

Availability of data and material

All data pertaining to the research is kept in good custody by the author.

Acknowledgements

The author acknowledges having contacted respondents from public Mauritian universities to gain insightful data for this research.

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